AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

Listing of Claims:

Claim 1 (Currently Amended): A system for estimating quantities of pollutant compounds emitted in the exhaust gases of a diesel engine of a motor vehicle, comprising means for regenerating a solid particulate filter, an electronic control unit for managing the engine operation comprising data memories, ~~characterized in that it comprises~~ and further comprising:

[[-]] one or more neural networks ~~(1)~~;

[[-]] input data ~~(2)~~ representative of the engine operation and, optionally, of the vehicle movement, said data ~~(2)~~ being available in the electronic control unit for managing the engine operation without adding a sensor; and

[[-]] means ~~(4)~~ for cumulating the estimated quantities ~~(3)~~.

Claim 2 (Currently Amended): The system as claimed in claim 1, ~~characterized in that it comprises~~ comprising 10 to 15 neurons.

Claim 3 (Currently Amended): The system as claimed in either of claims 1 and 2, ~~characterized in that it comprises~~ further comprising training databases of the neural network, ~~or networks (1)~~ said databases being vehicle drive sequences of at least a few minutes.

Claim 4 (Currently Amended): The system as claimed in ~~any one of claims 1 to 3 characterized in that~~ claim 1, wherein the data used at the input of the neural network or networks ~~(1)~~ comprise at least one of the following parameters:

[[-]] the engine speed ~~(7)~~ at two consecutive times t and t-Δt;

[[-]] the fuel flow rate ~~(8)~~ at three consecutive times t, t-Δt and t-2Δt;

[[-]] the engine coolant ~~(9)~~ temperature; and

[[-]] the vehicle speed ~~(10)~~ at time t;

where Δt is the preset time interval between two consecutive measurement times and ~~characterized in that it comprises~~ further comprising means for estimating at least the cumulative quantity ~~(16)~~ of the soot in the exhaust gases which will be retained by the particulate filter.

Claim 5 (Currently Amended): The system as claimed in ~~any one of claims 1-4, characterized in that~~ claim 1, wherein the data used at the input of the neural network or networks ~~(1)~~ comprise at least one of the following parameters:

[[-]] the engine speed ~~(7)~~ at two consecutive times t and t-Δt;

[[-]] the fuel flow rate ~~(8)~~ at three consecutive times t, t-Δt and t-2Δt;

[[-]] the engine coolant ~~(9)~~ temperature; and

[[-]] the fuel-air ratio ~~(18)~~ of the mixture at time t;

where Δt is the preset time interval between two consecutive measurement times and ~~characterized in that it comprises~~ further comprising means ~~(15)~~ for estimating at least the cumulative quantity ~~(16)~~ of the soot in the exhaust gases which will be retained by a particulate filter.

Claim 6 (Currently Amended): The system as claimed in ~~any one of claims 1 to 5~~ claim 1, adapted to an engine with common rail injection, ~~characterized in that~~ wherein the data used at the input of the neural network or networks ~~(1)~~ at time t comprise at least one of the following parameters:

[[-]] the fuel preinjection rate ~~(19)~~ in the engine;

[[-]] the main ~~(2)~~ fuel injection rate in the engine;

[[-]] the relative displacement ~~(21)~~ of a piston with respect to top dead center from the time when the last fuel injection in the piston cylinder started;

[[-]] the relative displacement ~~(22)~~ of a piston with respect to top dead center from the time when the last main fuel injection in the piston cylinder started;

[[-]] the engine coolant temperature ~~(9)~~;

[[-]] the engine air feed rate ~~(23)~~;

[[-]] the pressure ~~(24)~~ inside the common rail; and

[[-]] the engine speed ~~(7)~~;

and ~~in that~~ wherein the estimated quantities of pollutant compounds comprise at least one of the following quantities:

[[-]] the cumulative quantity ~~(16)~~ of the soot in the exhaust gases that will be retained by a particulate filter;

[[-]] the cumulative quantity ~~(35)~~ of nitrogen oxides in the exhaust gases;

[[-]] the cumulative quantity ~~(31)~~ of the carbon oxides in the exhaust gases; and

[[-]] the cumulative quantity ~~(27)~~ of hydrocarbons in the exhaust gases.

Claim 7 (Currently Amended): The system as claimed in ~~any one of claims 1 to 6, characterized in that~~ claim 1, wherein no output ~~(3,5)~~ from the system is looped to an input ~~(2)~~ of the system to avoid any problem of stability.

Claim 8 (Currently Amended): The system as claimed in ~~any one of claims 1 to 7, characterized in that it comprises~~ claim 1, further comprising means for resetting the estimated quantities of particulates, independently of each other.

Claim 9 (Currently Amended): A method for evaluating a system ~~implementing any one of claims 1 to 8, characterized in that it evaluates~~ of claim 1, said method comprising the step of evaluating the best configuration of the neural network or networks ~~(1)~~ by calculating the error on the output quantities ~~(3)~~ by cumulation on a sliding window.

Claim 10 (Currently Amended): The method as claimed in claim 9, ~~characterized in that~~ comprising the step of determining the sliding window ~~is determined~~ so that its size is minimal while allowing an estimation error lower than a preset value.

Claim 11 (Currently Amended): The method as claimed in claim 10, ~~characterized in that~~ wherein the size of the window corresponding to a vehicle movement varies between 0.5 km and 1.5 km to allow an estimation error of not more than 5 g of solid particulates emitted per 135 km traveled by the vehicle.

Claim 12 (Currently Amended): The method as claimed in ~~any one of claims 9 to 11, characterized in that~~ claim 9, comprising the step of discarding part of the data reserved for

training the neural network or networks ~~(1) is discarded~~ to perform a validation without the data used.

Claim 13 (Currently Amended): ~~The application of the system as defined in either of claims 6 and 7, to control~~ A method of controlling the means for regenerating the solid particulate filter of either claims 6 and 7, the method comprising the step of comparing ~~using a comparison between~~ the estimated quantity of cumulative soot ~~(16) and~~ with a memorized threshold value.

Claim 14 (Currently Amended): ~~The application of the system as defined in claim 8, to aid the calibration of~~ A method of calibrating engine control strategies ~~from the estimation of the~~ comprising a step of estimating engine emissions over a vehicle drive cycle, wherein said estimating step is performed with the system as defined in claim 8.